

EOS Production Sites Network Performance Report: February 2014

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Mostly stable flows**
 - **GPA: 3.76** ↓ (was 3.79 last month).
- **Requirements:** from the Network Requirements Database
- **1 flow below Good**
 - **GSFC → EROS:** **Almost Adequate**

Ratings Changes:

Upgrades: ↑: None

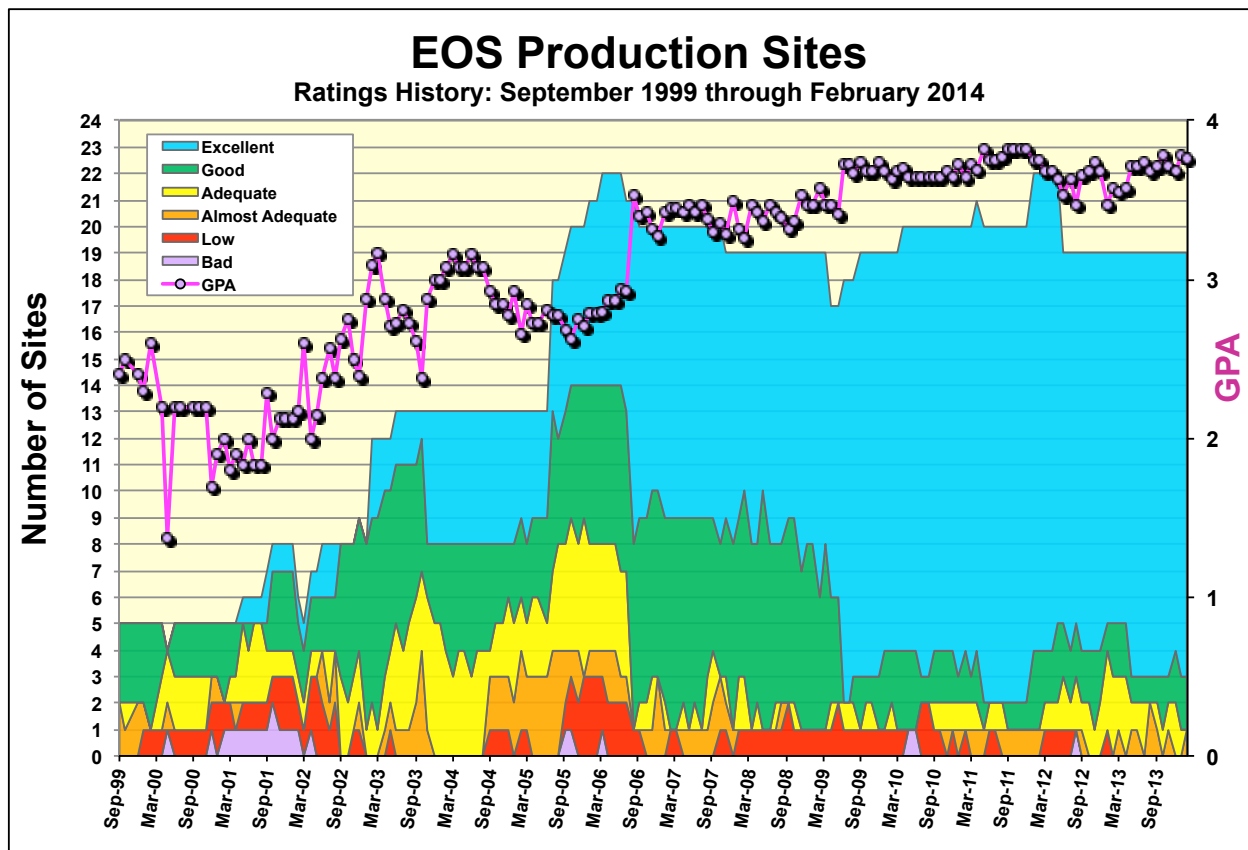
Downgrade: ↓: **GSFC → EROS:** **Adequate** → **Almost Adequate**
(Slight change)

Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.5 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.5
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that “**Almost Adequate**” implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:

The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

- 2011 April: Added RSS to GHRC
- 2011 May: Deleted WSC to ASF for ALOS
- 2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
- 2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. EOSDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

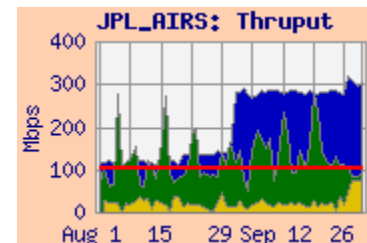
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

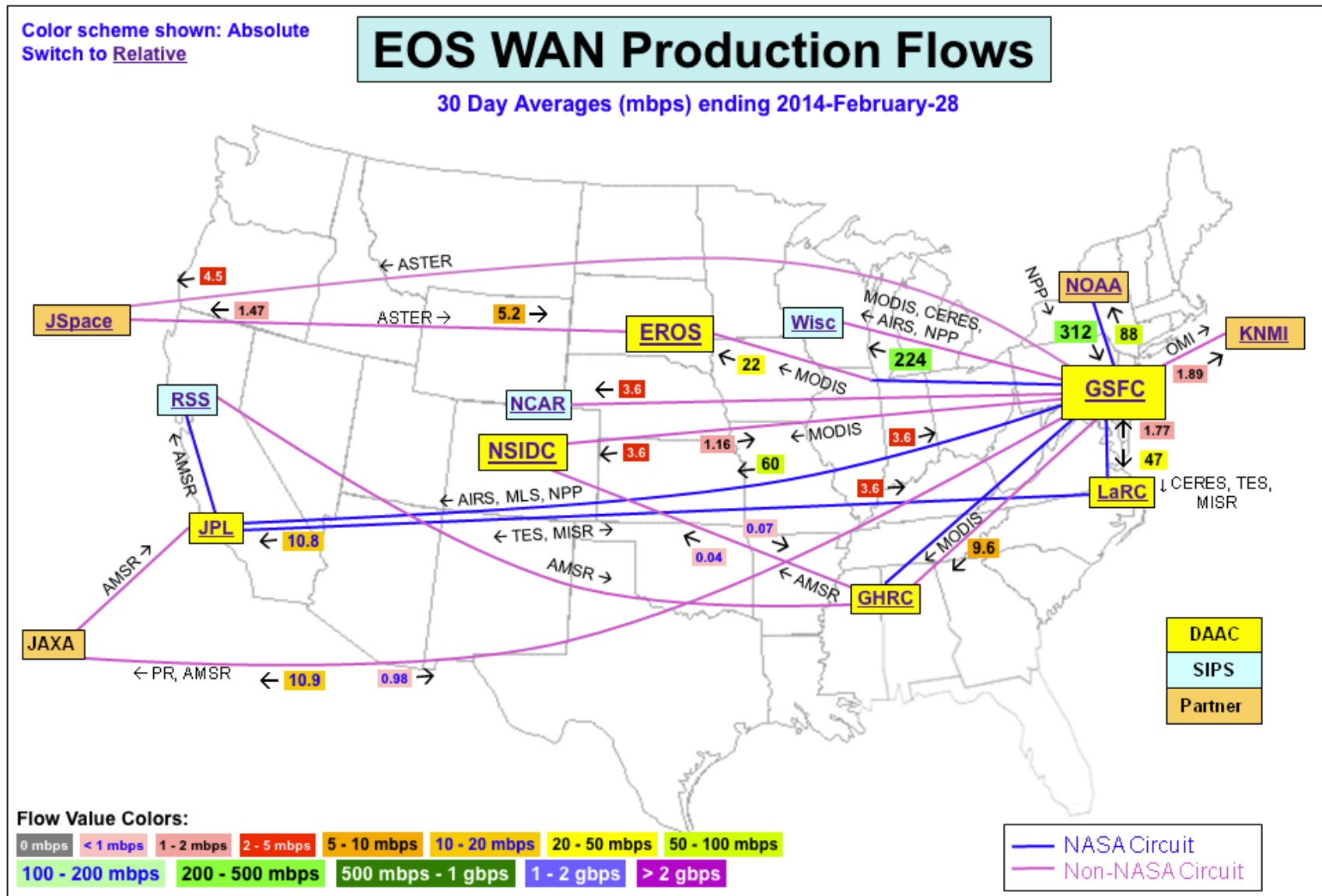
Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf throughput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.



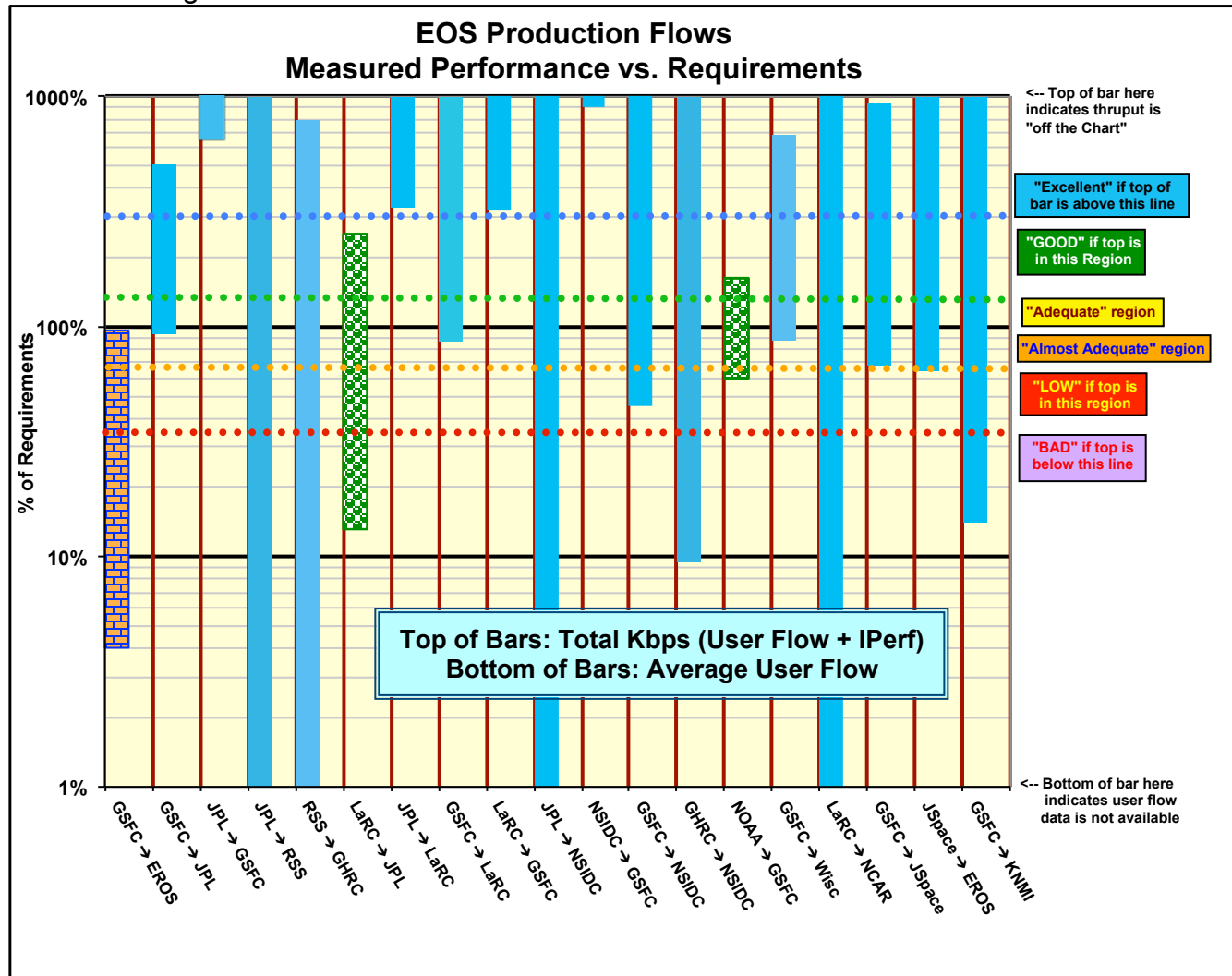
Network Requirements vs. Measured Performance

February 2014		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements	
		Database	HB 1.4.3+					This Month	Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	22.1	527.8	527.8	A A	Adq
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS1 → JPL-AIRS	58.3	303.1	318.9	Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.7	361.7	361.7	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		14.5		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.34	RSS (Comcast) → GHRC (UAH)		2.52		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	11.0	211.6		Good	Good
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	3.6	174.2		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS → LaRC ASDC	45.2	877.5	880.3	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.79	934.1	934.2	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		340.6		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	1.16	387.7	387.7	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	3.8	555.5	555.5	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.04	13.0	13.0	Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	312.6	780.0	849.1	Good	Good
GSFC → Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	225.1	1708.2	1758.8	Excellent	Ex
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		154.6		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS, GPM	3.51	0.1	GSFC-EBnet → JAXA	11.0	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E, GPM	0.16	0.1	JAXA → GSFC-EBnet	0.99			n/a	n/a
GSFC → JSpace	ASTER	6.75	5.4	GSFC-EDOS → JSpace-ERSD	4.59	63.3	63.3	Excellent	Ex
JSpace → EROS	ASTER	8.3	8.3	JSpace-ERSD → EROS PTH	5.36	125.6	125.6	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	1.89	281.5	282.8	Excellent	Ex
		Significant change from HB v1.4.3 to Requirements Database				Ratings Summary			
		Value used for ratings						Database Req	
								Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent		16	16
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3				Good		2	2
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		0	1
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement				Almost Adequate		1	0
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5				Low		0	0
	Bad	Total Kbps < Requirement / 3				Bad		0	0
						Total Sites		19	19
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP				GPA			3.76	3.79



This chart shows the averages for the main EOS production flows for the current month. Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value (when available) is used to determine the ratings.



1) EROS:

Ratings: GSFC → EROS: **Adequate** → **Almost Adequate**
 ERSDAC → EROS: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	748.9	527.8	286.7	22.1	527.8
GSFC-EDOS → EROS LPDAAC	382.1	238.8	97.4		
GES DISC → EROS LPDAAC	628.3	367.5	125.7		
GSFC-ENPL → EROS LPDAAC	1030.0	1017.4	928.6		
JSpace-ERSD → EROS LPDAAC	248.4	125.6	39.1	5.36	125.6
NSIDC SIDADS → EROS PTH	921.0	906.2	878.7		
GSFC-ENPL → EROS PTH	2315.7	2270.3	2040.0		
GSFC-ENPL → EROS PTH (IPv6)	779.9	678.2	535.3		
GSFC-NISN → EROS PTH	891.2	820.6	426.8		
ESDIS-PS → EROS PTH	845.1	763.5	373.7		
LaRC PTH → EROS PTH	177.8	159.0	122.2		

Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Almost Adequate
ERSDAC → EROS	FY '06 -	8.33	8.3	Excellent

Comments: **1.1 GSFC → EROS:** The rating is based on the **MODAPS-PDR** Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. The average user flow this month was only about 4% of the new requirement.

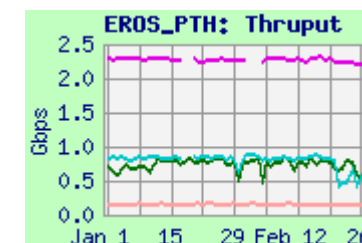
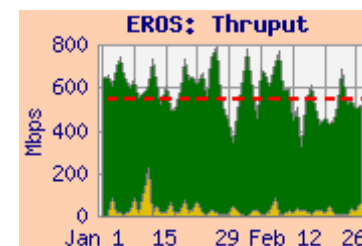
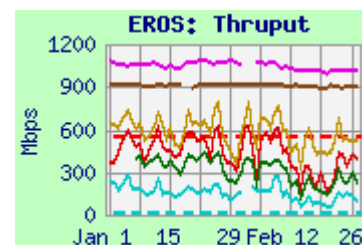
The integrated thrupt from **MODAPS-PDR** to LPDAAC was mostly stable, but the median decreased slightly, and was slightly below the requirement, so the rating drops to **Almost Adequate**. Thrupt from **GSFC-EDOS** and **GES DISC** (also on EBnet) also decreased slightly. The route from EBnet sources is via the Doors, to the NISN 10 gbps backbone, to the NISN Chicago CIEF, then via GigE, peering at the StarLight Gigapop with the EROS OC-48 tail circuit.

Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from **GSFC-ENPL** to EROS is from GSFC via a direct 10 gig connection to the MAX, to Internet2, to StarLight in Chicago. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is well in excess of the requirement – it would be rated **Excellent**. **GSFC-ENPL IPv6** tests were restored in December, and appear limited to 1 gbps.

1.2 JSpace-ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been stable since mid December.

1.4 LaRC → EROS-PTH: The thrupt from **LaRC-PTH** to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that **LaRC-PTH** outflow is limited to 200 mbps by NISN at LaRC.



2) to GSFC**2.1) to NPP, GES DISC, etc.**Ratings: NOAA → NPP SD3E: Continued **Good**NSIDC → GES DISC: Continued **Excellent**LDAAC → GES DISC: Continued **Excellent**JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtmlhttp://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	838.1	780.0	639.7	312.6	849.1
EROS LPDAAC → GES DISC	406.5	221.7	106.4		
EROS PTH → GSFC-ESDIS PTH	922.4	662.3	103.3		
JPL-PODAAC → GES DISC	761.9	361.7	94.1	3.7	
JPL-TES → GSFC-NISN	613.7	279.0	59.4		
LaRC ASDC → GES DISC	936.2	934.1	873.4	1.79	
LARC-ANGe → GSFC-ESDIS PTH	936.6	936.3	924.0		
NSIDC DAAC → GES DISC	479.2	387.7	281.5	1.18	
NSIDC DAAC → GSFC-ISIPS (scp)	31.2	30.3	26.2		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL → GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good

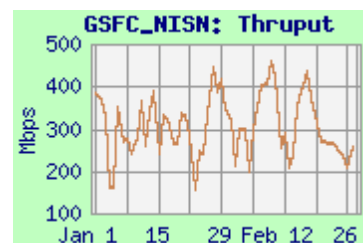
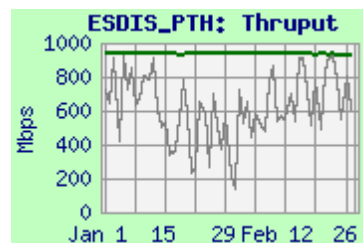
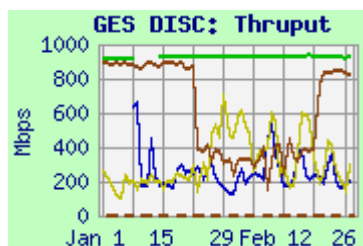
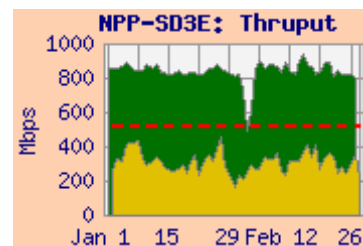
Comments:

2.1.1 NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at about 850 mbps, limited by the Gig-E interface on the NOAA side test machine (the circuits are all 10 gbps). User flow was close to usual, very close to the requirement without contingency.

2.1.2 EROS LPDAAC, EROS-PTH → GSFC: The thrupt for tests from **EROS LPDAAC** to GES DISC and from **EROS-PTH** to ESDIS-PTH were again noisy.

2.1.3 JPL → GSFC: Thrupt from **JPL-PODAAC** is noisy but stable. Note that JPL → EBnet flows take Internet2 instead of NISN, based on JPL routing policies. With the modest requirement the rating remains **Excellent**. The 2.7 mbps average user flow was close to typical and the old requirement, and well above the new [reduced] requirement.

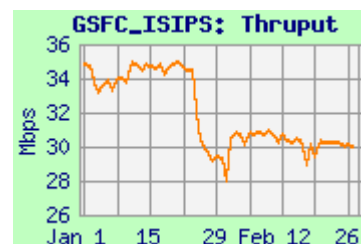
Testing from **JPL-TES** to GSFC-NISN is routed via NISN PIP, and shows the capability of that network.



2.1) to NPP, GES DISC continued.

2.1.4 LaRC → GSFC: Performance from **LaRC ASDC** to GES DISC was very stable this month, due to a host upgrade at ASDC last month. Thruput from **LaRC ANGe** to ESDIS-PTH was also stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was similar to last month – about 3 x the requirement.

2.1.5 NSIDC → GSFC: Performance from **NSIDC** to GES DISC improved in mid October, due to an upgraded host at NSIDC, dropped in January due to NSIDC routing issues, and recovered in February. It remained way above the tiny requirement, so the rating remains **Excellent**. The user flow was again well above both the old and lower new requirement. Thruput to **GSFC-ISIPS** using SCP initially improved with the new host at NSIDC, but then dropped with an ISIPS host upgrade. It remains well above the requirement.

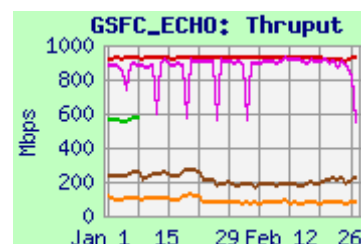


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	n/a	n/a	n/a
EROS LPDAAC ftp	n/a	n/a	n/a
GES DISC	935.2	926.6	890.8
GES DISC ftp	935.7	901.4	534.2
LaRC ASDC DAAC	n/a	n/a	n/a
NSIDC DAAC	216.4	192.6	143.1
NSIDC DAAC ftp	110.3	80.9	34.3



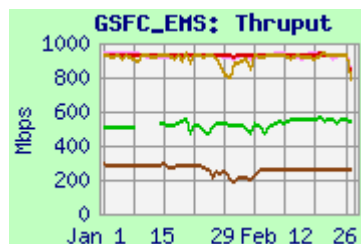
Comments: Performance was mostly stable from **GSFC** and **NSIDC**. FTP performance is mostly limited by TCP window size – especially from sites with long RTT. Testing from **EROS LPDAAC** stopped working in December, and from **LaRC ASDC** in early January due to host upgrades – firewall rules have been requested.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfcc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	n/a	n/a	n/a
ESDIS-PTH	936.2	925.7	745.8
GES DISC	936.3	931.9	733.5
LARC ASDC	560.4	538.7	384.3
MODAPS-PDR	936.4	923.2	498.5
NSIDC-SIDADS	258.2	255.8	230.6



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Testing from **EROS LPDAAC** stopped working in December with the host upgrade at EROS – firewall rules have been requested. Performance was quite stable from other sources.

3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Excellent**

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E-OPS1 → JPL-AIRS	611.6	303.1	162.6	58.3	332.5
GSFC-GES DISC → JPL-AIRS	411.2	321.2	170.7		
ESDIS-PTH → JPL-AIRS	449.2	239.7	118.5		
GSFC-NISN → JPL-AIRS	160.3	47.5	25.9		
NPP-SD3E-OPS1 → JPL-Sounder	703.8	326.1	166.3		
GSFC-NISN → JPL-Sounder	281.2	90.3	43.2		
ESDIS-PTH → JPL-MLS	493.2	354.6	177.6		
GSFC-NISN → JPL-MLS	424.1	208.5	75.2		
ESDIS-PTH → JPL-PODAAC	163.5	113.1	55.0		
GSFC-NISN → JPL-PODAAC	100.9	67.0	34.3		
MODAPS-PDR → JPL-PODAAC	72.7	50.8	17.2		
ESDIS-PS → JPL-QSCAT	91.6	83.4	63.7		
GSFC-NISN → JPL-QSCAT	71.8	59.7	39.5		
GSFC-EDOS → JPL-SMAP	85.1	70.5	47.5		
GSFC-EDOS → JPL-OCO2	84.4	70.6	51.2		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

Comments:

3.1.1 AIRS , Overall:

http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml

The requirements were switched in June '12 to use the requirements database, instead of Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

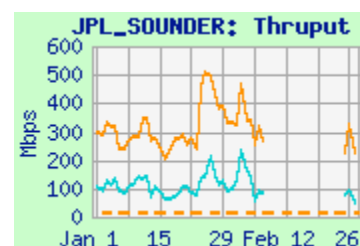
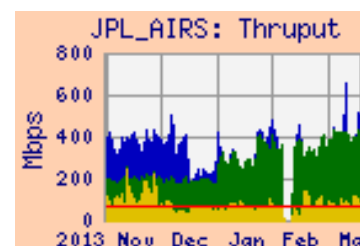
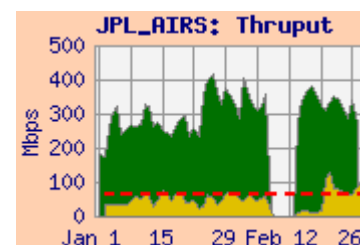
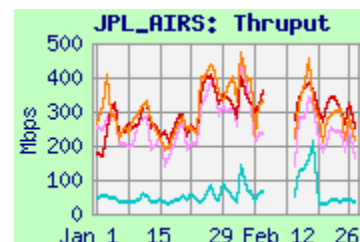
The AIRS tlc node was moved to a new location in June 2013. When testing resumed about 2 weeks later, throughput was significantly lower from all sources. Throughput from **NPP-SD3E-OPS1** dropped in mid **December**, and mostly recovered in late January. The median integrated throughput remained above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

3.1.2 The JPL overall rating is also based on the **NPP-SD3E-OPS1** to JPL AIRS throughput, compared with the sum of all the GSFC to JPL requirements. The median throughput remained above 3 x this requirement, so the overall rating remains **Excellent**. The average user flow this month was close to the requirement -- after November's peak.

3.1.3 NPP to JPL Sounder:

http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml

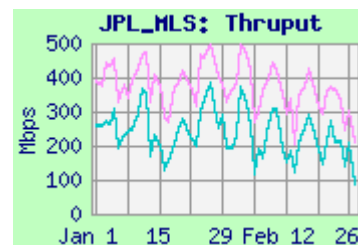
Testing from **NPP IDPS-Mini-inf** was discontinued in December, when that node was retired, and was replaced by testing from **NPP-SD3E-OPS1**, which had better throughput. The Sounder node was down for most of February. Performance for the time it was up from **NPP-SD3E-OPS1** and **GSFC-NISN** had large diurnal variation, but was mostly stable.



3.1) GSFC → JPL: continued**3.1.4 MLS:**

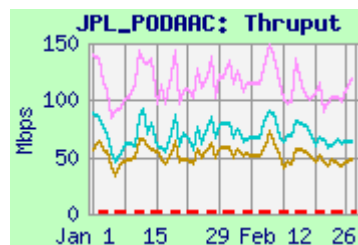
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml

Thruput from both **ESDIS-PTH** and **GSFC-NISN** experienced diurnal congestion this month. Both were way above the modest requirement, so the rating remains **Excellent**.

**3.1.5 PODAAC:**

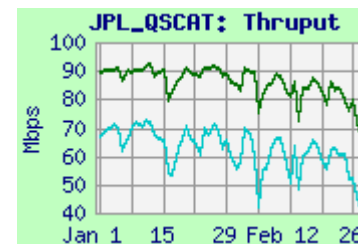
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

There is no longer a requirement from GSFC to JPL PODAAC in the database. But performance was mostly stable; thruput was way above the previous 1.5 mbps PODAAC requirement.

**3.1.6 QSCAT:**

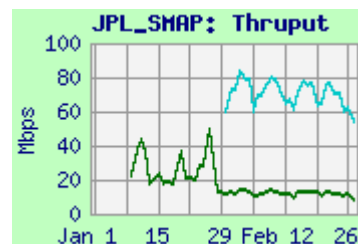
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml

There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from **ESDIS-PS** and **GSFC-NISN** to QSCAT remains well above the modest previous 0.6 mbps requirement.

**3.1.7 SMAP:**

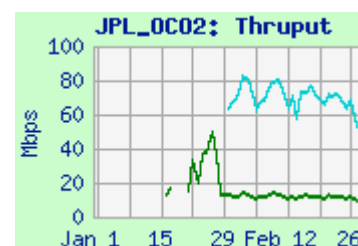
http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml

There is no requirement from GSFC to JPL SMAP in the database [yet]. Testing from EDOS to SMAP resumed in January, using a **single stream**. Testing using **6 streams** was added in February, with almost 6 times the thruput.

**3.1.8 OCO2:**

http://ensight.eos.nasa.gov/Organizations/daac/JPL_OCO2.shtml

There is no requirement from GSFC to JPL OCO2 in the database [yet]. Testing from EDOS to OCO2 was initiated in January, using multiple streams, but was switched to a **single stream** at the end of January. Testing using **6 streams** was added in February, with almost 6 times the thruput.



3.2) LaRC → JPLRating: Continued **Good**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtmlhttp://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
LaRC ASDC → JPL-TES	436.4	211.6	77.1	
LaRC ANGE → JPL-TES	371.2	271.5	153.1	
LaRC PTH → JPL-TES	178.0	129.1	62.3	
LaRC PTH → JPL-TES sftp	25.4	19.3	5.7	
LaRC ASDC → JPL-MISR	n/a	n/a	n/a	
LaRC PTH → JPL-MISR	78.1	70.6	52.8	0.67
LaRC ANGE → JPL-PTH	87.7	86.0	82.2	11.0

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Good
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Almost Adequate
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

3.2.1 LaRC → JPL (Overall, TES): Performance from LaRC ASDC to JPL-TES improved dramatically in early January with the ASDC node upgrade! It is now similar to the throughput from LaRC ANGE, and that previously seen from LaRC ASDC until April 2012. The median throughput is now more than 30% above the combined requirements (and almost by 3 x), so the Overall rating remains **Good**.

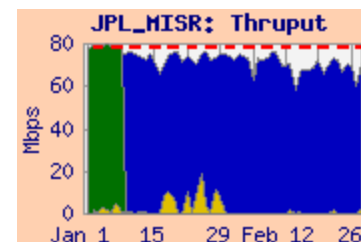
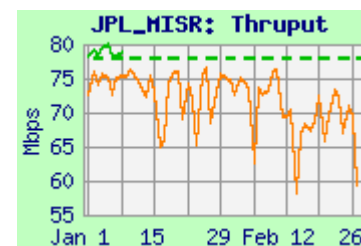
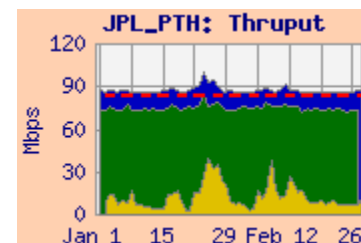
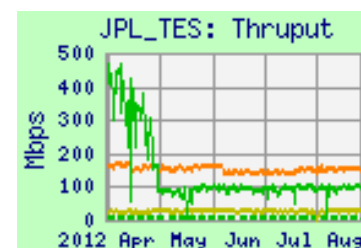
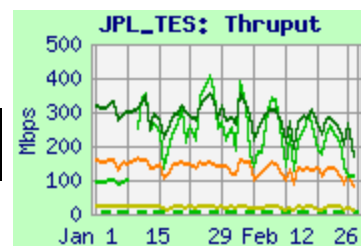
The median throughput remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement). The user flow this month was about the same as last month and well below the requirement.

Performance from LaRC PTH to JPL-TES is stable, but is limited to 200 mbps by agreement with CSO / NISN.

3.2.2 LaRC → JPL-MISR: Testing from the upgraded ASDC node is still blocked, so no results from ASDC to MISR is available after the upgrade. Throughput from LaRC to JPL MISR is limited by the Fast-E connection to the MISR node. User flow was well below normal this month, averaging only 1% of the requirement. Throughput to MISR stabilized in December, after being very noisy (again) in November and early December. The median integrated throughput from LaRC PTH was slightly below the MISR requirement, so the MISR rating drops **Almost Adequate**.

The LaRC → JPL Overall rating is not based on this result, since it not indicative of the capability of the network.



4) LaRC

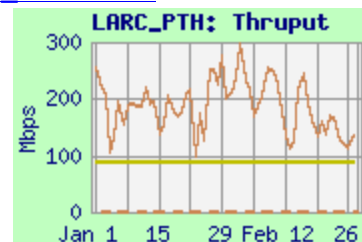
4,1) JPL → LaRC

Rating: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	88.8	88.7	88.5	3.63
JPL-TES → LaRC PTH	336.7	174.2	52.6	



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	Excellent

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thrupt from JPL-TES was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was again more than triple the 1.1 mbps requirement.

Thruput from JPL-PTH to LaRC-PTH has been stable at the higher of its two common states (88 mbps) since January 2013, when it switched from the lower of its two common states (60 mbps). It is limited by a Fast-E interface on JPL-PTH (upgrade in progress).

4.2) GSFC → LaRC:**Rating:** Continued **Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	935.5	935.1	672.8	45.2	935.2
GSFC-EDOS → LaRC ASDC	904.5	877.5	638.4		
ESDIS-PTH → LaRC-ANGe	922.1	873.4	516.3		
GSFC-NISN → LaRC-ANGe	905.4	872.8	646.1		
GES DISC → LaRC-PTH	611.8	602.0	584.8		
GSFC-NISN → LaRC-PTH	620.0	607.8	588.6		
NPP-SD3E → LaRC-PTH	642.3	623.9	527.5		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

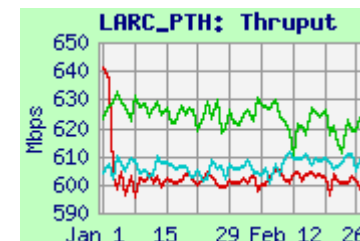
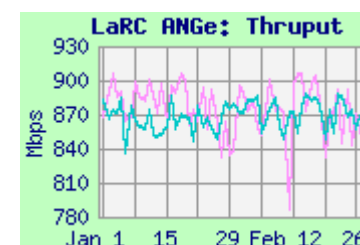
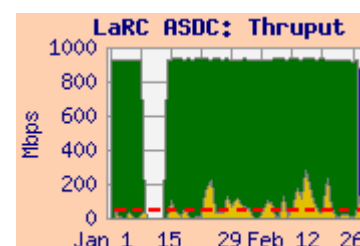
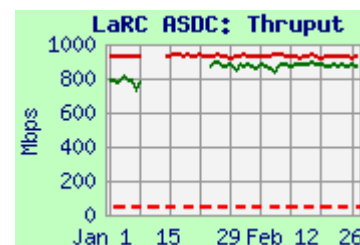
Comments:

GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS a bit lower, but improved with the ASDC host upgrade in early January.

As seen on the integrated graph, the 45.2 mbps average user flow this month was close to typical and the requirement.

GSFC → ANGe (LaTIS): Testing to ANGe ("Bob") from both **ESDIS-PTH** and **GSFC-NISN** was stable, close to the circuit limitation. (Note the expanded scale on the graph).

GSFC → LaRC-PTH: Testing to LaRC-PTH from **GES DISC**, **NPP-SD3E**, and **GSFC-NISN** was stable, but below performance to ASDC and ANGe.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	580.0	555.5	104.0	3.8	555.5
GES-DISC → NSIDC DAAC	633.8	616.7	77.2		
GSFC-EDOS → NSIDC DAAC	405.0	398.8	43.9		
ESDIS-PTH → NSIDC DAAC	608.4	178.1	46.5		
GSFC-ISIPS → NSIDC (iperf)	621.7	618.1	36.8		
JPL PODAAC → NSIDC DAAC	422.3	340.6	204.1	0.04	13.0
GHRC → NSIDC DAAC (nuttcp)	68.5	13.0	2.0		
GHRC → NSIDC DAAC (ftp pull)	59.2	8.1	2.1		

Requirements:

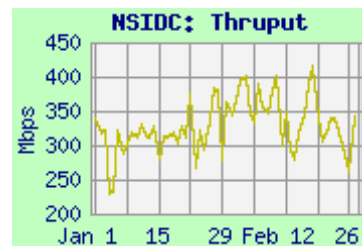
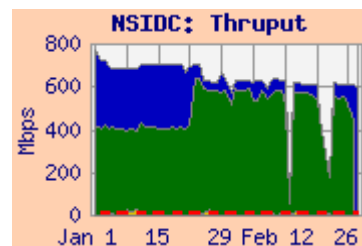
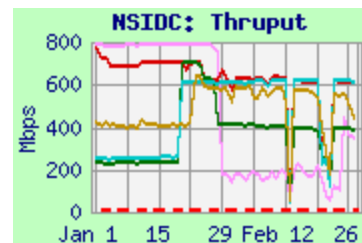
Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

Comments: 5.1.1 GSFC → NSIDC S4PA: The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08).

The integrated thrupt from **MODAPS-PDR** was very noisy (max : min ratio was 5.6), but the remained well above 3 x the requirement, so the rating remains **Excellent**. The 3.8 mbps average user flow was close typical, and consistent with the requirement without contingency.

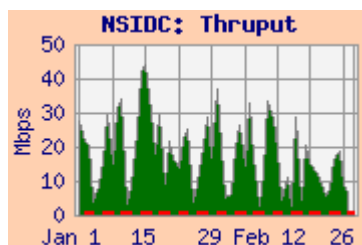
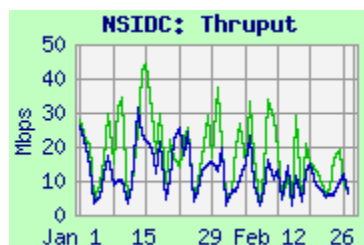
Testing from **GES-DISC**, and all other sources was also very noisy, with high max : min ratios. Testing from **GSFC-EDOS** and **GSFC-ISIPS** was retuned in mid January with parameters similar to **MODAPS**, and achieved similar results. However, routing changes apparently caused step changes in thrupt.

5.1.2 JPL PODAAC → NSIDC S4PA: This requirement was reduced from 1.34 mbps in May '09. Thrupt from **JPL PODAAC** to NSIDC is well above the requirement; the rating remains **Excellent**. Note the expanded scale on the graph.



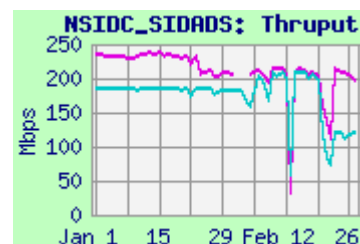
5) Boulder CO sites (Continued):

5.1.3 GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via Internet2. The median integrated throughput remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**.



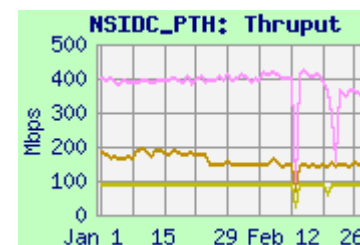
Test Results: NSIDC-SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	217.0	207.1	29.0
GSFC-NISN → NSIDC-SIDADS	208.7	183.3	32.0
ESDIS-PTH → NSIDC-PTH	442.2	399.8	101.3
MODAPS-PDR → NSIDC-PTH	216.4	146.2	73.8
JPL-PTH → NSIDC-PTH	89.3	89.0	74.4



5.1.4 GSFC → NSIDC-SIDADS: Performance from **GSFC-NISN** and **GSFC-ENPL** to NSIDC-SIDADS also very noisy, with high max ; min ratios.was very stable.

5.1.5 NSIDC-PTH: Thruput from all sources to NSIDC-PTH was also very noisy this month. **JPL-PTH** is limited by its Fast-E connection (upgrade in progress).



5.2) LASP:

Ratings: LASP → GSFC: Continued **Excellent**

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>

Test Results:

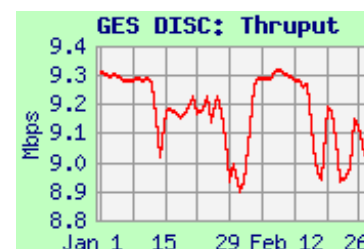
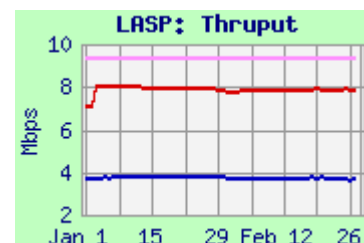
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.76	3.72	3.64
ESDIS-PTH → LASP blue (iperf)	9.37	9.36	7.07
GES DISC → LASP blue (iperf)	7.86	7.84	6.15
LASP → GES DISC	9.27	9.18	8.81

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent

Comments: In January '11, LASP's connection to NISN PIP was rerouted to a 10 mbps connection to the NISN POP in Denver; previously it was 100 mbps from CU-ITS via NSIDC.

Iperf testing from **GES DISC** has been stable since mid February 2013, when it improved with the GES DISC firewall upgrade. Iperf and SCP testing from **ESDIS-PTH** was also very stable, and consistent with the circuit limitation, as was return testing from **LASP** to GES DISC, rating **Excellent**.

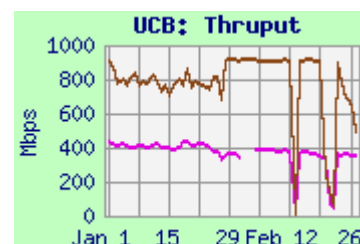


5.3) UCB:

Web Page <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL	413.8	367.6	33.4
GSFC-ESTO	920.6	908.0	13.3



Comments: Testing to the 10 gig connected test node at UCB began failing consistently in mid-May 2013, so testing was switched to a 1 gig test node in mid-June. The route is via Internet2 to FRGP, similar to NCAR. Thruput from both GSFC-ENPL and GSFC-ESTO was very noisy this month, similarly to other Colorado destinations.

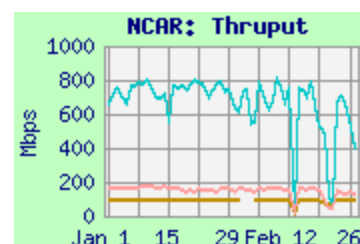
5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
 GSFC → NCAR: Continued **Excellent**

Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	177.5	154.6	15.5
GSFC-ENPL-10G	4920.3	3049.9	1066.4
GSFC-ENPL-FE	94.6	94.3	19.7
GSFC-NISN	856.3	666.0	12.3

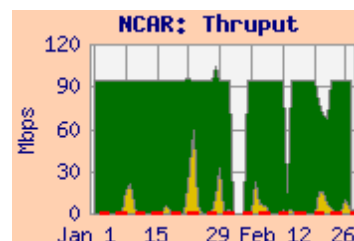
**Requirement:**

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent

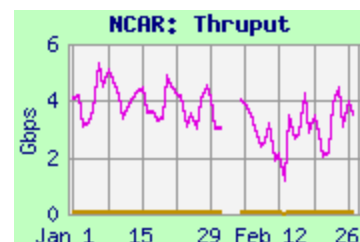
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued.

From LaRC: Thruput from LaRC-PTH was very noisy, as with all Colorado destinations this month, but the median remained well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.



From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thruput was very noisy this month, but the median was well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC-EBnet this month was 4.3 mbps, below last month's 5.9 mbps, and well above the revised requirement (including contingency), but close to the previous requirement



From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is also noisy, and gets close to 5 gbps on peaks.

6) Remote Sensing Systems (RSS):

Ratings: JPL → RSS: Continued

Excellent

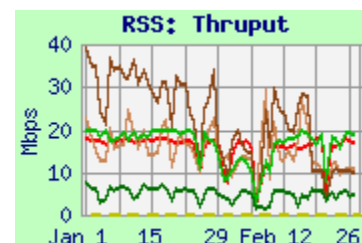
RSS → GHRC: Continued

Excellent

Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	39.2	14.5	4.6
JPL TES → RSS (Comcast)	49.2	12.3	3.6
GSFC-NISN → RSS (Comcast)	18.1	16.2	9.6
GHRC-UAH → RSS (Comcast)	20.8	17.3	1.5
GHRC-NISN → RSS (Comcast)	8.4	4.7	1.3
RSS (Comcast) → GHRC (UAH)	2.88	2.52	0.46
RSS (Comcast) → GHRC (NISN)	3.59	2.85	0.71



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	Excellent
RSS → GHRC	CY '12 -	0.32	0.34	Excellent

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL). Note that AMSR-E is not operating at this time, so that data is not flowing. However, AMSR2 is operating on JAXA's GCOM-W1 spacecraft, and sending data to RSS (but this is not an EOS requirement).

At the end of March 2012, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing. Testing via the NISN circuit to RSS was discontinued at that time.

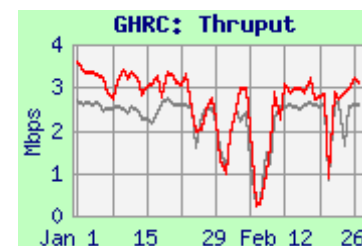
JPL → RSS: The median iperf from JPL PODAAC was noisy and lower than last month, but remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

GHRC → RSS: Testing from the UAH server at GHRC was noisy but stable, with significant diurnal variation. Testing from the NISN server at GHRC was also noisy, but lower than from UAH.

GSFC → RSS: Testing from GSFC-NISN was noisier this month. Previously, it had degraded around the beginning of June, indicating a peering problem between NISN and Comcast, but recovered at the end of June.

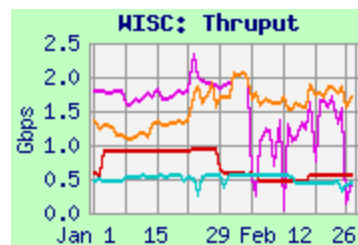
RSS → GHRC: The server at RSS on the Comcast circuit allows "3rd party" testing, as do the servers at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar. The performance to both was noisier than previously, but remained well above 3 x the reduced requirement, so the rating remains **Excellent**.

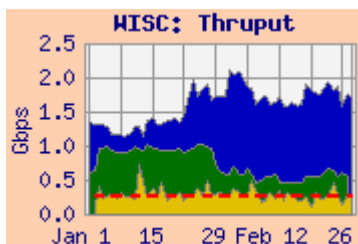


7) Wisconsin:Rating: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	2014.6	1708.2	1247.9	225.1	1758.8
GES DISC	556.3	551.0	467.9		
GSFC ENPL	1892.1	1239.5	21.9		
LaRC ANGe	562.4	488.8	256.9		

**Requirements:**

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Excellent
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Excellent
LaRC Combined	CY'12 -	n/a	7.9	n/a



Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: At the end of March 2013, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with thruput now typically close to 2 gbps.

User flow was very close to the requirement, similar to last month.

Testing from **NPP-SD3E** was also switched to Wisconsin's 10 gig server, in May 2013, with thruput now usually over 1 gbps! The integrated thruput from **NPP-SD3E** remained above the NPP requirement by 3 x, so the NPP rating remains **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so the combined rating also remains **Excellent**.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On 23 April, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruput from **LaRC ANGe** remains well above the previous 7.9 mbps requirement; it would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.

8) KNMI:Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
OMISIPS → KNMI-ODPS	492.3	281.5	146.2	1.89	308.7
GSFC-ENPL → KNMI-ODPS	631.0	542.8	320.5		

Requirements:

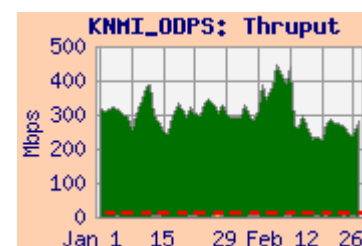
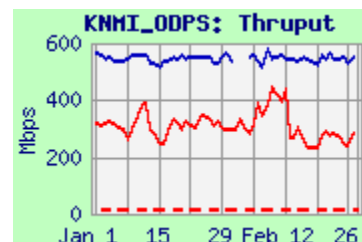
Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	Excellent

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2+ x 10 gbps circuit to Frankfurt, then via Surfnnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from **OMISIPS** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from **OMISIPS** somewhat noisy this month, from **GSFC-ENPL** thruput was higher and more stable. The median thruput was stable and remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 1.9 mbps this month, similar to recent months, but only 14% of the revised requirement.



9) JSpace - ERSD:

Ratings: **GSFC** → **ERSD**: Continued **Excellent**
ERSD → **EROS**: Continued **Excellent**
ERSD → **JPL-ASTER-IST**: N/A

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → JSpace-ERSD	64.9	63.3	36.8	4.6	63.3
GES DISC → JSpace-ERSD	94.1	92.3	67.7		
GSFC ENPL (FE) → JSpace-ERSD	84.9	81.7	78.8		
GSFC ENPL (GE) → JSpace-ERSD	481.4	460.8	126.0		
JSpace-ERSD → EROS	248.4	125.6	39.1	5.4	125.6
JSpace-ERSD → JPL-TES	120.0	63.2	27.1		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → JSpace-ERSD	'12 -	6.75	5.4	Excellent
JSpace-ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
JSpace-ERSD → EROS	'12 -	8.33	8.3	Excellent

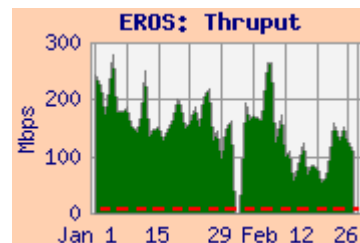
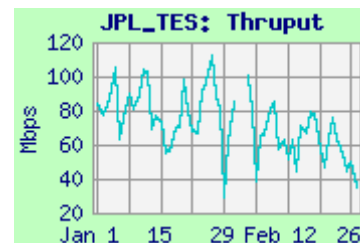
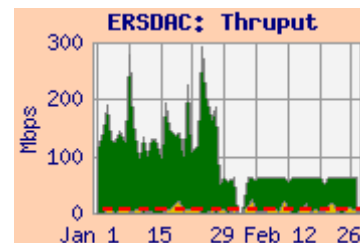
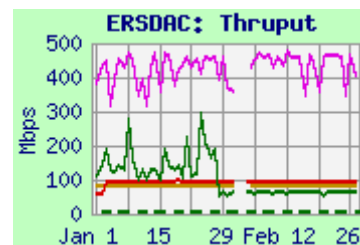
Comments: **GSFC** → **JSpace-ERSD**: The median thrupt to JSpace-ERSD from most sources improved in September 2011, when the connection from JSpace-ERSD to Tokyo-XP was upgraded to 1 gbps (from 100 mbps). Peak thrupt from **GSFC ENPL** is now often over 400 mbps.

Performance to all Asian destinations over APAN declined severely beginning at the end of November; the problem was fixed in mid December.

Median thrupt from **GSFC-EDOS** dropped in late January, due to reconfiguration at EDOS (fixed in early March), but remained well above 3 x the reduced requirement, so the rating remains **Excellent**. The user flow was close to normal from GSFC to JSpace-ERSD this month, consistent with the requirement.

JSpace-ERSD → **JPL-ASTER-IST**: The JPL-ASTER-IST test node was retired in October 2012. JPL no longer uses a distinct IST; instead, JPL personnel log in directly to the IST at JSpace-ERSD. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES would be rated **Excellent**.

JSpace-ERSD → **EROS**: The thrupt improved with retuning in October '11, after the ERSDAC Gig-E upgrade. Thrupt remains well above the reduced requirement (was 26.8 mbps previously), so the rating remains **Excellent**. The user flow this month was consistent with the requirement.

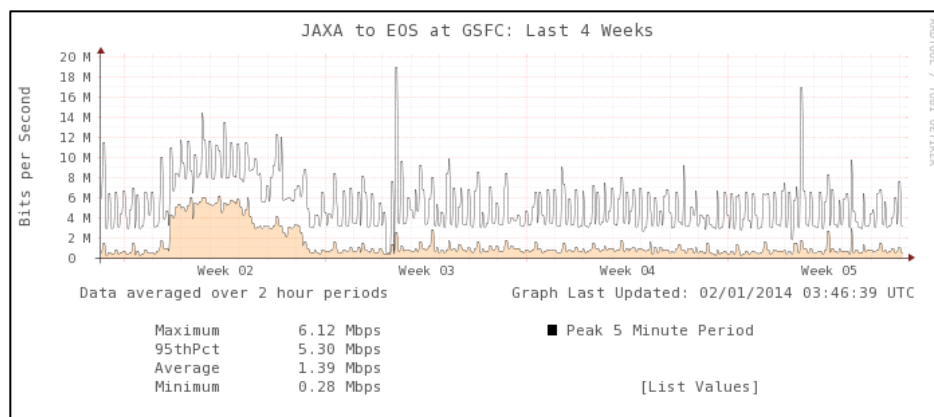
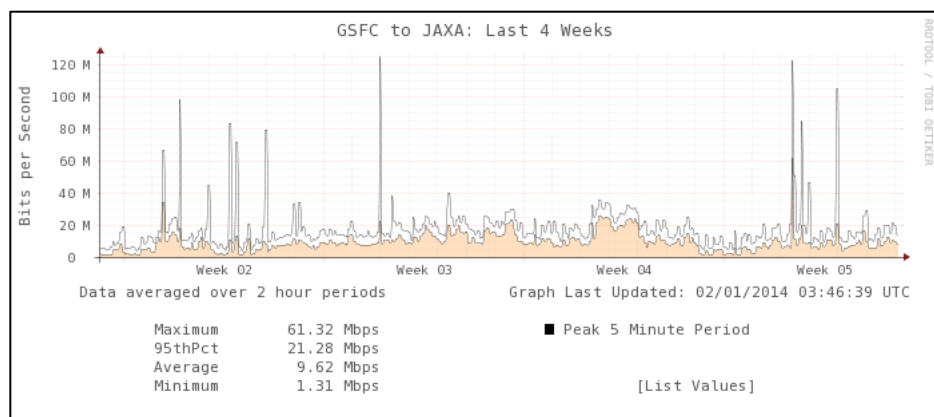


10) US \leftrightarrow JAXARatings: US \rightarrow JAXA: N/AJAXA \rightarrow US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – primarily for GPM -- but has declined to participate.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 9.6 mbps from GSFC-EBnet to JAXA, and 1.4 mbps from JAXA to GSFC-EBnet. **The route from GSFC to the Tokyo Exchange Point and JAXA is via APAN, so performance was reduced from late November until mid December.**

These values are above the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.



After the APAN drop was corrected, testing was switched to the Tokyo-XP 10 gig server, with much improved results, well in excess of the JAXA requirements. However, performance dropped below 1 gbps in January.

